

REMARKS

This reply is submitted in response to the office action dated June 8, 2005.

Claims 1-120 are pending.

Claims 66-70, 73, 75-112, 114, 115, 119, and 120 are withdrawn.

Claims 1-65, 71, 72, 74, 113, 116-118 are rejected.

Claims 2, 6, 7, 8, 9, 10, 11, 15, 18, 19, 23, 24, 113, 116, 117, and 118 are amended. Support for the phrase "a specific gravity of from 0.700 to 0.860" is found at page 22, line 32. Support for the phrase "where the NFP has a pour point of -40 °C or less" is found at page 11, line 13-15.

Claim 16 is cancelled.

New claims 121-155 are presented. Support can be found at previous claims 77 to 120. No new matter is added.

New claims 156-160 are presented. Support for the new claims can be found at original claims 77 to 120, page 18, line 5, page 21, line 22 -27, page 22, line 6 -10, and page 22, line 28-31. No new matter is added.

New claims 161-170 are presented. Support for the phrase "wherein elastomers are substantially absent from the composition" is found at page 54, lines 1-3. No new matter is added.

Restriction Requirement

Claims 1-120 have been subjected to restriction under 35 USC § 121 to four groups. They are:

- I. Claims 1-65, 71, 72, 113, 116-118 drawn to a fiber.
- II. Claims 66-70, 73, 75, 76, 114, and 115 drawn to an article.
- III. Claims 77-112 and 120 drawn to a nonwoven article.
- IV. Claim 119 drawn to a diaper.

Applicant confirms the provisional election of Group I, with traverse. Applicant respectfully requests that the Examiner withdraw the restriction requirement. To begin Applicant notes that claims 108 and 109 are drawn to a fiber not to a non-

woven article as stated by the Examiner. Applicant respectfully requests claims 108 and 109 be included with Group I.

The Examiner argues that Group I is distinct from Groups II, III and IV because the fiber can be wrapped around an article for fastening and thus Group I is an intermediate to the final products in Groups II, III, and IV. Applicant respectfully disagrees and submits that a single fiber is not enough to wrap around an article and fasten it. This is particularly true when one considers that fibers used to make nonwovens are typically just centimeters long. Applicant respectfully requests that the restriction requirement be withdrawn.

Applicant also respectfully submits that the new claims fall within Group I.

Rejection under 35 USC § 112, second paragraph

Claims 19, and 116-118 are rejected under 35 USC § 112, second paragraph for failing to particularly point out and distinctly claim the subject matter that Applicant regards as the invention.

Claim 19 has been amended to insert the word "where" as the Examiner suggests.

Claims 116, 117 and 118 have been amended to correct dependency by inserting "An article comprising the" in place of "The" in line 1 of the claims.

Claimed Invention

Applicant's claimed invention relates to fibers and non-wovens comprising blends of one or more polyolefins with one or more non-functionalized plasticizer's (NFP's), where the NFP's have specific characteristics. For example independent claims 6, 7, 8, 9, 10, 11 and 15 all require the NFP to have a Viscosity Index (VI) of 120 or more. Likewise, claim 1 requires the NFP to have a kinematic viscosity at 100 °C (KV₁₀₀) of 2 cSt or less.

These specific characteristics lead to improved product properties in fibers and non-wovens, among other things. For example, for many of Applicant's embodiments (for example those falling within claims 6, 7, 8, 9, 10, 11 and 15, et seq.), VI is an important parameter. Viscosity Index is a measure (developed by the engine lubricant

industry) of the practical implications of the molecular structure of a liquid. VI is determined by plotting viscosity versus temperature for a particular liquid. A higher VI indicates that the structure and or properties of a liquid are such that temperature has less effect on viscosity versus a fluid with a lower VI. Most liquids get thinner (less viscous) when heated and thicker (more viscous) when cooled. A high VI liquid will have less variance in product properties over a broad temperature range as compared to a low VI liquid. A high VI is desirable in engine lubrication end uses because engine lubricants are required to be easy flowing at low temperature (to allow the oil to be pumped around a cold engine) and stay thick at higher temperatures (to continue protecting the engine from wear at the high under hood temperatures). As one example of why a high VI (100 or more, preferably 120 or more) is useful in Applicant's claimed invention please consider fibers and non-wovens to be used in cold environments, such as operating rooms which are kept at temperatures as low as 50 °F or house wrap which is exposed to winter cold. In these situations normal mineral oils typically thicken, and therefore then to lose whatever plasticizer effect they had (or worse they crystallize and become brittle). This leads to stiff fibers at best and brittle ones at worst. Applicant's compositions however do not thicken as much at low temperatures because the liquid has a high VI and thus the fibers and non-wovens retain their flex and softness. Note that none of the references cited by the Examiner herein disclose or suggest that this VI parameter is important and that this specific subset of fluids should be selected for fiber and nonwoven use.

Another example that Applicant's claimed specific NFP's are unusual and non-obvious is the NFP's having a KV₁₀₀ of 2 cSt or less. These molecules have high volatility compared to normal mineral oils, which has use when their effect is meant to be temporary (such as a processing improvement without modification of final mechanical properties). In the case of primarily isoparaffinic NFP's with KV₁₀₀ of 2 cSt or less and pour point of -40 °C or less (claim 2), the effect on the mechanical properties is much stronger than normal mineral oils which have pour points above -40°C (typically above -25°C). The consequence of this is that the flexibility and or softness of the fiber or non-woven at lower temperatures (such as -40°C) is greater than the same composition where mineral oil is used instead of Applicant's claimed fluids.

Rejections under 35 USC § 102(b) and or 35 USC § 103(a)

Howard in view of Edman, Kwalik and or Coppersmith

Claims 1-65, 71, 72, 74, 113 and 116-118 stand rejected under 35 USC § 103(a) as obvious over Howard (US 5,230,843) in view of Edman (US 3,439,088), Kowalik (US 6,197,285) or Coppersmith (US 3,818,105). The Examiner suggests that Howard describes a process for forming fibers and filaments from a blend of polyolefin with filler and plasticizer, where the plasticizer can be a "petroleum hydrocarbon oil." The Examiner then suggests that Edman, Kowalik and Coppersmith disclose compositions comprising isoparaffins and that it would be obvious to use the isoparaffins from Edman, Kwalik, or Coppersmith in Howard to obtain Applicant's claimed invention. Applicant respectfully disagrees and submits that the claimed invention is not obvious from Howard in view of Edman, Kwalik, or Coppersmith.

Howard is directed toward to a process of making microporous fibers and filaments comprising mixing an ultrahigh molecular weight polyolefin (typically polyethylene) with filler and extractable plasticizer (col 1, ln 65). The extractable plasticizer may be hydrocarbon petroleum oil (col 3, ln 63). Specific oils are not disclosed except for the one used in the examples, Shellflex 412. Applicant has obtained an MSDS for Shellflex 412 from the internet (copy attached) *apparently* dated May 20, 1991. Shellflex 412 is described as a hydrotreated heavy naphthenic distillate used as a process extender oil and is reported to have a specific gravity of 0.9218, a flash point of 196 °C, and a kinematic viscosity of 90-110 cSt at 104 °F (40 °C). The kinematic viscosity at 100°C (KV₁₀₀) of Shellflex 412 is not reported. However, Applicant notes that naphthenic oils are known to have VI's in the range of 30 to 80 (see, for example, Table 2 of attached technical brochure on Shellflex naphthenic oils), and according to the ASTM protocol defining how to measure VI (ASTM D2270) a liquid with a KV₁₀₀ less than 2 cSt is defined to have no VI, i.e. it is unmeasurable. Looking at it in another way, if Shellflex 412 were to have a KV₁₀₀ of 2 cSt, while also a KV₄₀ of 90 – 100 cSt, it would have to have a *negative* VI. So while we may not know the exact KV₁₀₀ for Shellflex 412, it is reasonable to conclude that Shellflex 412 has a KV₁₀₀ greater than 2 cSt. Further, to estimate the actual KV₁₀₀ value, we can use the following logic: Shellflex

412 is roughly similar other Shellflex naphthenic oil grades, which have a minimum VI of about 30 (which corresponds to maximum temperature dependence of viscosity) and has a minimum kinematic viscosity at 40°C of 90 cSt; using these values and the calculations procedures described in ASTM D2270, the minimum KV₁₀₀ value for Shellflex 412 would probably be about 8 cSt.

From the information above it is clear that Shellflex 412 does not fall within any of Applicant's claims, specifically independent claim 1 which requires a KV₁₀₀ of 2 cSt or less. Furthermore, the hydrocarbon oils in Howard are selected so they can be withdrawn (extracted) from the composition after processing. In fact a solvent is applied the fiber or filament to remove the oil, presumably to aid in making the fiber or filament microporous. Consequently, nothing within Howard discloses or suggest Applicant's particular NFP's having a KV of 2 cSt or less at 100 °C, which preferably remain in Applicant's fibers. Furthermore, Edman, Kwalik, and Coppersmith do not fill this gap.

Edman, Kwalik, and Coppersmith do disclose various cosmetic compositions using isoparaffin solvents. However nothing within Edman, Kwalik, or Coppersmith suggests that such solvents could be used in fibers and filaments. Likewise nothing within Howard suggest using cosmetic compositions in fibers. Thus there is no reason one of ordinary skill in the art would combine these references. It is only with the forbidden tool of hindsight reconstruction using Applicant's claims as a map that one of ordinary skill in the art would think to combine Howard and any of Edman, Kwalik, or Coppersmith. In fact the unusual idea of using a solvent normally used in cosmetics for polyolefins is a striking and unexpected aspect of Applicant's invention. Isoparaffins have been used for decades in cosmetic applications (note that Edman, Coppersmith, and Kwalik are published in 1969, 1974, and 2001 respectively). Whole disciplines have grown up around such cosmetic uses in this area. Likewise heavy refined petroleum oils, like Shellflex 412, have long been used as oil extenders and process aids with polyolefins. Whole disciplines have grown up around these heavy oil uses as well. These disciplines were often separate however. In Applicant's company, as in many chemical companies, the groups studying and performing research in the two areas were organized separately and often even housed in different locations. Such arrangements are common in the chemical industry. Thus, it was not obvious for a polyolefin compounder

to select cosmetic grade isoparaffins having KV100 of 2 cSt or less for use in polyolefin modification.

Applicant submits that while some scientists may have known about isoparaffin cosmetic uses, it was completely unexpected that anything that went into a cosmetic was good for a fiber and didn't just bleed away. Cosmetic compositions packed into little round dishes or long round tubes are a world apart from fibers and non-wovens. Thus Applicant respectfully submits that one of ordinary skill in the fiber art would not have been motivated to look to the cosmetic art for fiber formulations or aids. Further nothing within the four corners of the four references cited (Howard, Edman, Kwalik, and Coppersmith) discloses or even suggests such a combination. Applicant respectfully requests that the rejection under 35 USC § 103(a) be withdrawn.

Wisneki

Claims 1-65, 71, 72, 74, 113 and 116-118 stand rejected under 35 USC § 103(a) as obvious over Wisneki (US 4,663,220). The Examiner suggests that Wisneki discloses a combination of 60 wt% Kraton G 1652 and 40 Wt% Indopol L 14 for use in a fibrous non-woven web. The Examiner suggests that the Indopol L 14 has a pour point of -51 °C and a specific gravity of 0.8373, among other things, and hence the claimed invention is obvious over Wisneki. Applicant respectfully disagrees and notes that Indopol L 14 is a polybutene oil. Applicant has cancelled claim 16 directed to polybutenes. Likewise none of the other NFP's described in Applicant's claims are polybutenes. Polybutenes do not have KV₁₀₀'s less than 2 cSt, and do not have VI's over 120 in combination with specific gravities of 0.700 to 0.860. Further polybutenes are not oligomers of C5 to C14 olefins, do not have the specific paraffin branching ratios in claim 11 and do not have the side chain requirements of claim 15. Furthermore nothing within Winseki suggests any other fluid, much less Applicant's particular NFP's having certain KV₁₀₀'s, VI's, specific gravities, branching ratio's, etc. for use in fibers and non-wovens. Thus Applicant respectfully requests that the rejection under 35 USC § 103(a) be withdrawn.

Nishio

Claims 1-65, 71, 72, 74, 113 and 116-118 stand rejected under 35 USC § 103(a)

as obvious over Nishio (US 6,001,455). The Examiner suggests that Nishio discloses a composition for use as a sheet comprised of 32 wt% paraffin oil (Diana Process Oil PW-380) having a pour point of -15 °C, a KV₁₀₀ of 30.10 cSt and a specific gravity of 0.8769, and a 100pw of polyolefin blend comprising PP and EPDM (specifically Table 1, example 2) and thus Applicant's claimed invention is obvious therefrom. Applicant respectfully disagrees and submits the claimed invention is not obvious from Nishio.

Nishio discloses sheet shaped products made from a thermoplastic elastomer (TPE), preferably having an embossed pattern thereon, which shows excellent uniform extensibility and emboss retention when subjected to vacuum forming, stamping forming or pressure forming for making the skin of an automobile part, furniture or the like (Col 1, ln 6-15.) The TPE in Nishio is prepared by blending two components and then subjecting them to peroxide treatment. The two TPE components are typically a crystalline polyolefin, such as polypropylene (PP) and an elastomer, such as ethylene propylene diene monomer rubber (EPDM). (Note that EPDM is an elastomer not a plastomer as the Examiner suggests.) As one of several optional ingredients, Nishio discloses component E, which is described as a rubber-softening agent. (Col 7, ln 63) Component E is described as preferably a high boiling petroleum fraction which is in general a mixture of three components of aromatic ring, naphthene ring and paraffin chain with paraffin type being preferred. (col 8, line 1-11). Applicant respectfully notes that nothing within the four corners of Nishio's "TPE sheet for molded articles" patent discloses or suggests Applicant's specific NFP's for use in fibers and non-wovens.

Now turning to Example 2 in Table 1 as cited by the Examiner. Example 2 discloses a specific blend of PP, ethylene propylene rubber (EPR), EPDM, Diana Process Oil PW-380, crosslinking agent and peroxide. Diana Process Oil PW-380 is a common mineral oil often used in rubber softening and rubber extending. The Examiner reports that PW-380 has a pour point of -15 °C, a KV₁₀₀ of 30.10 cSt and a specific gravity of 0.8769. Thus, PW-380 does not have a KV₁₀₀ of 2 cSt or less, and does not have a specific gravity of 0.700 to 0.860. Further Diana Process Oil PW-380 does not have a VI in excess of 120 or more. We know this because Diana Process Oil has a kinematic viscosity at 40 °C (KV₄₀) of 381.6 cSt and kinematic viscosity at 100 °C of 30.1 cSt. VI is calculated from KV₄₀ (381.6 cSt) and KV₁₀₀ (30.1 cSt) as directed by ASTM D2270-

93, following Procedure B (for cases where VI is 100 or more) and specifically the instructions in Sections 6.1.1 and 6.1.3. The calculated VI for Diana Process Oil PW-380 is 110.3. Additionally mineral oils are refined petroleum products and are clearly not oligomers of C5 to C14 olefins, thus Diana Process Oil PW-380 is not a C5 to C14 oligomer. Further 27% of the carbons in Diana Process Oil are naphthenic carbons, i.e., in saturated ring structures (for PW-380 there are 27% naphthenic carbons, 73% paraffinic carbons according to US 6,013,729 Col 12, line 39-42). This means that Diana Process Oil PW-380, like mineral oils in general, do not have less than 2 weight % cyclic paraffins (e.g. naphthenics and or aromatics) as required by claims 11 and 15. Furthermore nothing within Nishio discloses or suggests any other fluid, much less Applicant's particular NFP's having certain KV₁₀₀'s, VI's, specific gravities, and or cyclic contents, etc. for use in fibers and non-wovens. Thus, Applicant respectfully requests that the rejection under 35 USC § 103(a) be withdrawn.

Maehara

Claims 1-65, 71, 72, 74, 113 and 116-118 stand rejected under 35 USC § 103(a) as obvious over Maehara (US 4,703,078). The Examiner suggests that Maehara discloses a composition comprising ethylene or propylene based (co)polymers, wax, and an oily fluid having a pour point of 25 °C or less. The Examiner then states that Diana Process Oil PW 380 and Idemitsu Polybutene 15R are listed as representative oils. The Examiner then concludes that it would have been obvious to follow the teachings of Maehara and arrive at the claimed invention. Applicant respectfully disagrees and submits the claimed invention is not obvious over Maehara.

Maehara discloses an artist's carving composition something like clay or playdough that can be carved or engraved "even by a beginner," (see abstract) not a fiber or a non-woven. Furthermore nothing within the four corners of Maehara discloses or suggests that such a composition would be useful for fibers or non-wovens. Consequently, Applicant's claimed invention is not obvious over Maehara. Furthermore, even if one were to try to make a fiber or non-woven out of Maehara's composition it would be an absurd exercise. Maehara's carving compound, like clay or playdough, cannot be spun into fibers, much less formed into nonwovens.

Turning now to the specific oils cited by the Examiner, Applicant notes that Diana Process Oil PW-380 has been discussed above in detail and has been shown to not fall within any of Applicant's claims. Further, Idemetsu's Polybutene 15R also does not fall within any of Applicant's claims. Polybutene 15R is a polybutene oil and, as described above for Indepol L 14, polybutenes do not have KV₁₀₀'s less than 2 cSt, and do not have VI's over 120 in combination with specific gravities of 0.700 to 0.860. Further polybutenes are not oligomers of C5 to C14 olefins, do not have the specific paraffin branching ratios in claim 11 and do not have the side chain requirements of claim 15. Thus the Examiner's proposed combination fails to make Applicant's claimed invention or make the claimed invention obvious. Thus, Applicant respectfully requests that the rejection under 35 USC § 103(a) be withdrawn.

Information Disclosure Statements

Applicant herewith submits a new information disclosure with additional references list on additional form 1449's. Authorization to charge the requisite fee is also included herein. In the event the authorization is separated from this supplemental reply, the Commissioner is authorized to charge the appropriate fee to deposit account 05-1712.

Applicant also notes that there are four other related US cases that the Examiner should be aware of as being related to this application. They are USSN 10/634,351, USSN 11/054,247, USSN 10/782,228, and USSN10/640,435. In particular Applicant notes that the office action in USSN 10/634,351 dated December 6, 2004 and the office action in USSN10/640,435 dated June 16, 2005 cite some of the same art as cited in the instant application. The Examiner is encouraged to examine those office actions and the responses thereto.

Applicant respectfully submits that the claims are in condition for allowance and respectfully requests notice of such.

The Commissioner is hereby authorized to charge any additional fees which may be required by this paper, or credit any overpayment, to Deposit Account Number 05-

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Respectfully submitted,

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